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A River of Risk: A Diagram of The History and Historiography of Risk Management

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ABSTRACT

The history of risk and risk management can be evaluated through the historiography of the subject. Writings on the history of risk and risk management can also be treated as pieces of evidence. A diagram is proposed describing some of the subjects and events influencing the development of risk management, focused through the theme of records management. A detailed exploration of the historiography is undertaken to indicate the relevance of the history of risk management to its present interdisciplinary status.

Keywords: Information management, Risk, Risk Management, Records Management
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1.0 INTRODUCTION: WHAT IS 'RISK'?

'Risk' is a term often used as a synonym for danger or hazards. More accurately, it describes a chance of an event's occurrence in terms of its likelihood, usually with a negative connotation - especially in the context of such subjects as finance. Risk, as this article postulates, is a transdisciplinary subject: it is found from the construction industry to records management. Risk can be viewed as the chance of an event happening as well as the measure of how much of a negative impact the event carries. Risk management is the act of assessing and reacting to risk, as well as interpreting risk either by itself or within a specific discipline. Risk is also used as a description of the outcomes of particular scenarios, such as drinking more units of alcohol than recommended per week, or smoking in excess of X cigarettes per day.

Works on the nature of risk now serve as our guides (literally and figuratively) and act as 'records' of our developing attitudes towards risk as a trans-discipline. Records management and risk are more intimately linked than previously thought (Saffady, 2005). Although archivists and information managers understand what practical risk there can be to our records, there is also scope for using our records as historians do, to describe the evolution of our thoughts about risk. Although there have been overviews of the history of risk (Bernstein, 1996; Barlow, 1993; Covello & Mumpower, 1985; Thompson, et al., 2005 & Althaus, 2005) and views on general risk management (Lemieux, 2004) - especially within the area of risk and 'disasters' which touch more than one discipline (Felix Kloman, 1999) - there is a lack of general historiographical writing on the subject of risk management which places the concept of transdisciplinarity into focus. An overview of this subject is necessary to briefly evaluate the historiography of risk in order to show us from where we have come.

This article proposes that even a brief evaluation of some of the articles and works written within a 50-year period can lead to a greater understanding of the origin of themes in risk management, and the possible origin of terms within the discipline of risk management. The main area of research interest for the author is that of risk management within records management, a subject not yet fully explored in literature.

There can be few disciplines in which there is little or no need for risk awareness. Within this article, an identification of technology as a driver for risk management demonstrates changes in perception of risk, and illustrates some of the current areas for concern in risk management. Historical events as drivers for risk management are also considered. The philosophy of risk is specifically omitted, as a transdisciplinary review of this could encompass another article by itself. The work concludes with thoughts on where this review may lead the transdisciplinary study of risk management. It is envisaged that this will become an important step in ensuing research which is focussed on risk management within records management.

2.0 'RIVER OF RISK'

Proposing that the history of risk management is traceable from several branches of events, technologies and disciplines, an apt diagram for examining this history is the tree diagram – here described as a ‘river’ whose confluences and sources run towards the creation of a disciplinary flow. Although simplifying events, it serves to clarify some placement of events and influencing factors within the growth and development of risk management in the last 50 years, albeit with many of the major works on risk retrospectives in the later half of this period. This diagram was developed from research about the history of risk management within records management, and was expanded to illustrate the areas connected with the history of risk management. The image is thematic and looks at a general progression of the advance of risk management as a discipline, rather than as a chronological one.

The image was developed in light of the fact that there has been no graphical representation of the findings of some of the major works such as Althaus (2005) and Thompson, Et al., 2005. The inspiration to create a graphical representation came initially from Felix Kroman’s (1999) study on milestones which showed

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a simple linear chronology of risk events. The concept of merging themes to show an overall convergence into an accepted understanding of ‘risk’ has not, to the researcher’s knowledge, been found elsewhere.

Basing research on the viewpoint of a historian, the researcher sought to create a timeline image which showed the current reflections on risk management, as well as noting some of the key risk events themselves, following Felix Kroman’s (1999) example.

2.1 Examining the diagram

The author has adopted a developmental approach describing the historiographical evolution of risk as a discipline and cross-discipline in diagrammatic form. The diagram of the ‘river of risk’ graphically describes some of the historical development of risk management. Topics and their offshoots, such as ‘mathematics’ and ‘decision theory’ are linked thematically rather than chronologically. This is a different approach compared with other works - Covello and Mumpower (1985) do not use thematic linkage, and instead use chronological linking to describe the evolution of risk management. Althaus (2005) examined her structure of the history of risk theory as a discipline review concentrating on works, with transdisciplinary scope, but no assessment of historicity of the trans-discipline as a whole. This paper therefore provides a form of examination of the thematic linkages between the topics and disciplines involved with risk management throughout a period of 50 years that has not been formally explored.

The ‘river of risk’ image serves to illustrate the kinds of interdisciplinary links that can occur within risk management. It is difficult to map these interdisciplinary links onto a chronological framework.

Technological changes, such as advances in computing science, are usually cumulative and therefore do not ‘end’ in a specific time period. These influences may continue for a long time, and may not ‘die out’.

One example is that of decision theory. This discipline still forms an influence on risk management.

Management practices themselves inform risk management. Arrows indicate the areas where there may be influence from one field of thought or history to another, e.g. events such as the Enron disaster (McLean & Elkind, 2004) linking to the area of risk analysis – practical risk. The Enron disaster itself strays into the area of risk legislation – The Sarbanes-Oxley Act (2001) was not the first to be enacted which dealt with data, but was certainly regarded as one which had effected change in risk management as well as data management (Cone, 2006; Ribstine, 2005; Ryan, 2004).

3.0 EARLY HISTORY OF RISK AND RISK MANAGEMENT

Within this study, the history of risk management has been traced back for approximately 50 years.

However, there is no consensus on the different dates for offered within the articles. Krinsky & Plough (1988) trace the origin of risk awareness back to Ancient Mesopotamia, based on the work by Covello and Mumpower (1985), as do Golding (1992) and Thompson, et al. (2005). Althaus (2005) traces a more linear and detailed postulated development through linguistics of the term ‘risk’. In reviewing the literature, there is support for the idea that risk management in its earliest developed stages was an offshoot from ‘decision theory’, evidenced by Bannister and Bawcutt (1981) as well as Althaus (2005) from the work of Arrow (1965), a work which discussed chance and probability in mathematical terms. Decision theory, discussed by Thomas (1972) notes the term ‘risky’ in a description of a problem of probability. However, the same work also states that decision theory has “...existed for about two decades”, thus giving us both a puzzle and a starting point. From this evidence, we can deduce that decision theory had ‘started’ at a point in the 1950s, but we are not given the area from which it sprang. The most likely explanation is from the discipline of mathematics, as is posited by some of Althaus’s work (2005). Boyne, (2003) within his comprehensive work on risk, refutes this in some instances. Rescher (1983) notes more practically the connections between probability in the case of risk events. Giddens (1998) notes that risk is a profoundly modern phenomenon, and dates the emergence of the conceptual term of ‘risk’ from the European Middle Ages. The development of management science, from some of its beginnings with the theorists such as Fayol (1988) and Cole (1990), led to the possibility of management’s decisions becoming

Figure 1: Diagram of the 'river of risk' - an illustration of risk management history and historiography rationalised as researchable subjects. Felix Kloman (1999) notes that in 1955, Dr. W. Snider of Pennsylvania University suggested to Dr. H. Denenburg that "the professional insurance manager should be a risk manager". Felix Kloman links this to Denenburg's later exploration of the ideas described in Fayol (1988), and in doing so, has provided one of the answers to the possible roots of risk management within other areas other than finance. Decision Theory, a form of management science looking specifically at risk in finance or risk as expressed through logical propositions, may have been one of the precursors of risk management, and had been discussed in an early volume (Arrow, 1965) which was later expanded upon in regards to 'risk-bearing'. Kleindorfer et al. (1993) have a broad view of the 'disciplinary roots' of decision sciences, as well as its legacy to other disciplines. Specifically identifying areas such as information systems and industrial organization, Kleindorfer et al. (1993) made a clear alignment with decision making and some of the fields where risk management is currently used. This work also mentions risk, but crucially does not equate risk with decision making.

4.0 HISTORICAL SOURCES FOR RISK

According to Covello and Mumpower (1985), an optimistically early dating of the practice of risk analysis is that of the time of ancient Mesopotamia, as well as ancient Greece and Rome, the former relating to sacerdotal practice and the latter to the history of philosophy (Covello and Mumpower, 1985). The main consideration of Covello and Mumpower's statements about the history of risk are that they are generic. A later statement about causality mentions the work *Airs, Waters, Places* "...thought to have been written by Hippocrates in the 4th or 5th century B.C." (Covello and Mumpower, 1985) However, there has been doubt cast on the singular nature of Hippocrates as the author of the whole 'Hippocratic Corpus' since 1945 (Jones, 1945) and this therefore casts doubt on the detailed nature of the rest of the archaic historical evidence that the paper expounds. It may be best to leave the speculation of the early historical origin of risk to an evaluative stance. Others have successfully expounded on the early philosophical history of risk, and yet others have continued in this tradition (Thompson, 1986, Luhmann, 1993, Rescher, 1983), showing an awareness that risk philosophy continues to grow in scope and stance. However, the use of the concept of risk within ancient philosophy has a large scope, and is too complex to investigate sufficiently within this article.

In terms of early historical examples cited by modern writers, Bernstein (1996) cites the St Petersburg Paradox as one of the first examples of risk assessment, based on the use of probability to assess the potential benefits of a hypothetical merchant sending a cargo in a poor season. Arrow (1965) also mentions this work, and references its earliest English translation by Sommer in 1954, from the German translation of Pringsheim in 1896, which in turn was translated from the 1738 Latin of Bernoulli (Bernoulli, 1738) (*See the footnote in Arrow, 1965, p.57*). Althaus (2005) traces the terminology of risk back far earlier, and has noted that the terminology for the Latin term 'riscare', and then a possible derivation from Portuguese:

"The Oxford English Dictionary (OED) suggests risk dates as a word from the 17th century, with the origin thought to be from the Italian *risco*, *riscare*, *rischiare*... Many commentators link the emergence of the word and concept with early maritime ventures in the premodern period, with Giddens suggesting the word came to English from the Portuguese or Spanish where it was used to refer to sailing into uncharted waters (Chambers Twentieth Century Dictionary explains the Spanish '*risco*' refers to "a rock"; Giddens says that one root of the term risk in the original Portuguese means 'to dare' (Althaus, 2005, p.570) Bernstein (1996) marks the use of the terminology and concept of risk from the 16th century CE, following the conclusion of Covello and Mumpower (1985) that the later sophistication of this period enabled further development in the science:

"...it was not until the emergence of probability theory in the 17th century that the intellectual tools for quantitative risk analysis became available."

Felix Kloman (Felix Kloman, 1999) takes a more objective stance to the history of risk, looking at the wide range of events which propagated risk as formative and causative:

"The major wars, from the Russo-Japanese, World Wars I and II, and Korea, to the regional conflicts that have followed, the advent of the automobile, radio, television and the computer, the Great Depression, global warming, the atom bomb and nuclear power, the rise and fall of communism, derivatives fiascoes, and the entire environmental movement have affected the development of risk management." (Felix Kloman, 1999)

The citation of these events is made as specific incidents of risk have created an effect which "stimulated

the discipline” (Felix Kloman, 1999) and therefore have encouraged its growth or given risk management a new direction. Aside from the obvious stimuli for risk management – disasters, such as Chernobyl – there are less evident events where risk management can be seen as a cross-discipline aspect of the aftermath of the event. One such event which Kloman cites as a milestone for risk is the formation in 1920 of the first captive insurance company, Tanker Insurance Company, Ltd. This insurance company is thought by Kloman (1999) to have started “... a movement that exploded in the 1970s and 1980s” (Felix Kloman, 1999). This is an explicit link with an event in time that shows a specific effect with finance, insurance and risk. This is a form of speculative historiography about the history of risk analysis and management, and it is not usually evoked by works discussing the discipline of risk management. The difference is that Kloman (1999) developed a history of risk management which is not strictly linear. Instead, it is charted by development rather than by chronology – although chronology is helpful in ordering the evolution of aspects of risk management.

As we have seen, risk has been perceived by its historiographers as having a specific historical origin grounded in such concepts as finance and physical types of risk. Further description of these areas is necessary to investigate these perceptions.

5.0 RISK TYPES – SUB-THEMES OF RISK

5.1 Financial Risk

Financial risk is usually linked with insurance (Bernstein, 1996, Holmes, 2002). This is one of the older areas of the history of risk that uses the term ‘risk’ explicitly to describe activities or factors of liability in activities. Linked to the history of probability, and using calculations to predict factors vital for insurance purposes (such as life expectancy tables), finance remains an area that deals with risk – though the term now has a multidisciplinary use, it still retains within this topic a sense of its historical origins. It takes on a different and specialised meaning. Finance is a specific discipline area from where it could be successfully argued the terminology of risk originated. Covello & Mumpower (1985) emphasise the development of quantitative risk analysis from this area, stating that “It would be difficult, if not impossible, to separate contemporary risk analysis from mathematical notions of probability.” (Covello and Mumpower, 1985). Financial risk can comprise several subgroups of risk, which are specifically associated with banking and finance. These are attributed by subject, e.g. operational, reputational and counterparty risk (Martin and Beans, 2000). Martin and Beans (2000) define operational risk in finance with Royal Bank’s description: “Royal Bank defines operational risk as all of those items that can lead to risk due to a break down in processes and actions of people both internally and externally” (Martin and Beans, 2000). Risk within finance, at the time of writing, has also moved into the public consciousness with the ‘risk’ and impact of sub-prime mortgages now being discussed and planned for by the Bank of England (BBC News, 2008). Moving to a related area in financial risk which also segues into generic risk management is the concept that risk can be avoided. One of the first uses of the concept of ‘risk aversion’ was defined in the terms of one who avoids risk within a financial topos:

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“A risk averter is defined as one who, starting from a position of certainty, is unwilling to take a bet which is actuarially fair...” (Arrow, 1965)

The concept of risk aversion is mentioned in modern literature dealing with generic risk. The HSE (Health and Safety Executive, 2001) use the term ‘aversion’ in the sense of risk aversion whilst discussing prevention of fatalities and reducing fatal risks. In this instance, higher (monetary) value of risk management – the concept of placing a value on such usually inestimable items as people’s lives - is more appropriate “for risks for which people appear to have a high aversion”.

Lane and Quack (1999) show a confluence of the philosophy of risk in their work, by allying business risk – in this instance, financial - with sociological risk. This approach can be traced to such authors as Douglas and Wildavsky (1982), as well as Luhmann (1993). This gives us another set of correlating points towards the early 1980s and 1990s as periods where the concept of ‘risk’ had expanded towards other areas, as Kleindorfer (1993) has explored, but not given time periods to.

Garven (2007) has noted the impact of risk to finance, and also cites his sources as being historically influenced (Garven, 2007). An extension within the areas of finance has been that of risk as a generic term for certain types of financial calculations, as can be seen in Ciborra (2006). However, this form of risk could be thought of as a distinct and separate (though possibly self-developing) strand of the history of risk management. Other further developments, or rather offshoots of the use of risk management within finance, have been the use of risk management tools within a financial framework (Gopal et al., 2005) thereby bringing a historical element back into the study: a sign of the circle of the history of risk management becoming a spiral which feeds back upon itself.

Rescher (1983) makes a very clear modern link between the probabilities of risk in multiple situations with mathematical diagrams of decisions and probability. However, he also uses these same diagrams to illustrate the oldest philosophical paradoxes, such as Pascal’s Wager – the wager of whether it would be better to

believe or disbelieve in God. Thompson (1986) looking in a historiographical perspective (*particularly reflecting on the problematic cruces in Rescher's text*) noted that this stance comes from Knight's work in 1920 (Knight, 1964):

"A tradition of thought which can be traced to Frank Knight's pioneering text on risk and uncertainty distinguishes between chance – the genuinely random potential for change in the universe – and probability, which may simply be a conditional description or prediction that substitutes for complete description when knowledge of full causal conditions is incomplete." (Thompson, 1986)

One spate of the 'river of risk' historiographically then can be traced from Knight (showing a connection between probability, finance and risk) through Rescher's concept of mathematical interpretation of risk (1983) and Thompson's philosophical viewpoint (1986). The awareness of the role of probability and finance in the discipline of risk and risk management is rather better documented than in other risk disciplines.

A philosophy of risk which picks out financial risk also looks at environmental risk as main topics for the text (Giddens, 1998). The text itself notes the ideas of other texts which describe the phenomena of financial risk situations, such as the collapse of Barings Bank (Giddens, 1998). In doing so, it can be seen that risk subjects have a certain degree of intertextuality. It is more likely than not that a work which mentions one type of risk will mention more within the context.

5.2 Physical and environmental risk

Risk management within areas such as construction, or areas where health and safety may be concerned are also involved in the output of articles and works on risk management. They are also some of the better sources for glossaries of risk vocabulary, as they are very specific about terminologies used within the publications.

Jeynes' (2002) publication of the 10 principles of risk management pertains solely to the management of

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risks in the physical and practical risk areas, such as industry. However, Jeynes' work states that each named risk management principle is itself representative of its own 'type' of risk. These risk principles, in such areas as 'performance' and 'purchasing' are clearly industry-linked. However, it again shows that risk management is put into categories by those handling it. 'Performance', according to Jeynes (Jeynes, 2002) covers "targets set, monitoring, measurement tools, consistency, [and] validity of data". The emphasis that these principles deal with physical, tangible things should not be ignored and the ideas subsumed under the general heading of risk management. There is, within this document, proof that risk is being seen as a measurable factor which can be sorted according to the type of object it affects; in this case, physical items or practices.

Environmental risk, connected intrinsically to technological risk in recent years (See Douglas and Wildavsky, 1982), deals with risk which has an ecological and social ramification, such as Peters (1992) and his work on the perception of the information dissemination at the time of the Chernobyl disaster in 1986. One of the first works in this genre was Rachel Carson's seminal volume, *Silent Spring* (Carson, 1962). This volume is, amongst other things, proof that risk can make a successful transdisciplinary input. Douglas and Wildavsky's work (1982) was the result of an ethnographical approach to an identification of social conditions as related to the perception of risk (Wuthnow et al., 1984).

5.3 Technological Risk

The scope of technological risk is great, and therefore can only be represented within this model by some points narrating basic concerns. Technological advances have opened up the field of risk management significantly. Barlow (1993) notes that "computers have radically changed the scene for risk managers... They help risk managers do a better job. And they have also brought new risks, some of high challenge to perception and control." (Barlow, 1993)

Data security and the security of records forms a major part of records management awareness; something which affects all disciplines and businesses. Practical technologically-linked new risks have been noted by Spangler (2006), who includes a comment from 'IT executives' in that "portable storage devices – namely, thumb-sized USB drives- scare them more than the possibility of a laptop vanishing" (Spangler, 2006). Technological advances show the need for 'technology risk management'; in this case, coping with the problem of security where technology has provided mechanisms for bypassing usual secure procedure. However, technological risk is not limited to security problems alone. Technological threats such as viruses are an external risk to computer users, but during the turn of the last century, the 'Millennium Bug', a proposed error in computing systems that would alter dates and confuse the calculations of computers, was considered a big enough risk to have significant preparation made to mitigate its effect (BBC News, 1998).

The advancement of the personal computer means that data storage and movement is now a commonplace in everyday life. The availability and longevity of data formats is therefore a valid concern. Darlington, Finney and Pearce (2003) were involved in reconstructing a computer program and database from 1986 that was in danger of becoming unreadable because of the format it was recorded on. The availability of

hardware and software with which to access data is also a concern that should be noted. At the time of writing, the file format created by Adobe (2007) known as the PDF (Portable Document Format) has become ubiquitous, and Adobe placed the format for consideration as a set standard with the ISO committee (Adobe Systems Incorporated, 2007), since approved as BS ISO 19005 – 1: 2005. However, the possibilities of future technology are unknown. Developers of software for PC operating systems were warned that for Microsoft's Vista OS (Microsoft, 2007) there may be issues with extant software, and that this would have to be addressed (CNET Networks Inc., 2007). Disparity between an older file format and a newer piece of hardware – or vice-versa – may result in the risk of data being permanently lost.

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6.0 CONCLUSIONS

The development of risk management has been that from a posited start in the ancient world, with evidence accreting for the development of the subject from the 16th century CE onwards. In terms of historiographical research, the path of development of risk management has not been clear. Instead, what has emerged from the historical evidence of papers and of terminology development is that risk as both a social and academic subject has both expanded and lost contact with some of its roots, taking on board such technical and socio-cultural events as the advent of war, and the construction of the backbone of telecommunications and electronic document transfer that we know as the Internet. Included are also hundreds of lesser-known causal factors that range from environmental awareness to the institution of regulations to enable transparency within large public organizations.

The philosophy of risk and practical risk management co-exist as separate subjects, dealing with the same topoi but in different areas and with different concerns. From the research done within this paper, it becomes clear that the background of risk has in part influenced the terminology of the field. The terminology of risk has proved fruitful in transference to different disciplinary areas, and has raised a new set of disciplinary aspects to consider.

The creation of a graphical representation of the potential development of the history of risk - is relatively new to the discipline, with few precursors (Felix Kloman, 1999, Golding, 1992) and certainly no illustrative ones that also seek to encompass the social and philosophical angles of the topic. The work, however, can not be said to be over. As a *de facto* part of its nature, historiography does not end at a specific point: it continues to grow and develop as the field does. The enactment of the Sarbanes-Oxley Act (2001) created a new era in the history of risk management and records management, from where the repercussions may not yet have been documented. One future task will be to record these articles too, as a continuation of the history of risk management.

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